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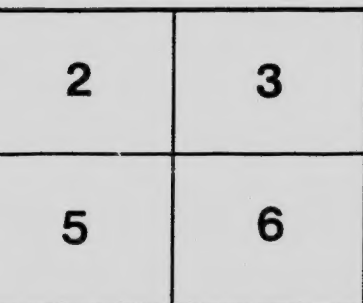
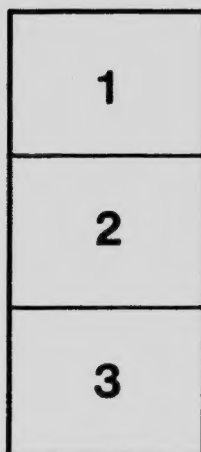
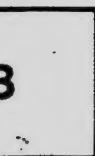
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DOMINION OF CANADA.
CENTRAL EXPERIMENTAL FARM.

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TOMATO CULTURE.

By W. T. MACOUN,
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The chief aim in growing tomatoes for the general market or for home use is to have early fruit. The profits from early tomatoes are much greater than from later ones. This being the case, it is desirable to have the plants well advanced when they are set out in the open. To have them well advanced it is necessary to start them early. In south-western Ontario seed is sown in greenhouses during the month of February. In colder districts the time extends to April, but it is sown in most places during the month of March. From nine to ten weeks should be allowed from the time of sowing until planting out, the plants not being set out until danger of frost is past. When the seed is started very early in greenhouses and transplanted several times, it is three months or more from time of sowing until time of planting out.

Every grower of tomatoes should grow his own seed. By careful selection from individual plants from year to year, the variety may be much improved from the standpoint of earliness, uniformity and productiveness. If home-grown seed be not used it should be obtained from reliable seedsmen who are known to have good strains.

The seed is sown in rich, loamy soil. If started in the greenhouse, it is usually sown in boxes or flats containing three to four inches of soil. There should be thorough drainage in the boxes, obtained by boring holes in the bottom. If seeds are planted in the dwelling house, boxes or pots also are used. When sown in a hot-bed the seeds are usually sown thickly, in rows about four inches apart. The seed is planted from one-quarter to one-half an inch deep and after covering with soil the latter is pressed down with the hand to firm it. The soil should be kept moist, but not wet. As soon as the rough-leaves appear, the little plants are pinched out about two inches apart each way into other flats or hot-beds. When grown for very early fruit they are again transplanted, when they have filled the space between them, to about four inches apart each way. A final transplanting is made to about six inches apart each way in hot-beds or cold frames, or they are planted in four to six inch pots and given plenty of room to develop. When grown in the hot-bed they should be transplanted at least twice. Strawberry boxes have been found very satisfactory to put the plants in at the final transplanting. What should be kept in mind and aimed at is the production of a stocky, sturdy plant which will have some fruit set upon it when it is planted in the field. A larger crop of early fruit can be obtained by pinching off the top of the plant after it has about six good leaves, which will result in laterals developing at the axils of the six leaves which are left on. These axillary shoots will each bear flowers if the plants be given sufficient room, and, if far enough advanced when set out, it may be readily seen that the crop of early fruit will be much larger than from the terminal shoot. To obtain the first ripe fruits as early as on the unpruned plants, the seed should be sown about three weeks earlier. The plants should eventually be between seven and eight inches apart

in the hot-bed to give the axillary shoots a good opportunity to develop. Plants should be hardened off well by giving good ventilation and removing glass in hot-beds in daytime before setting out, as they will stand cool air much better after planting.

In growing plants for the canning factory and in growing the medium and late sorts, much less trouble is taken. The seed is sown during the month of March and the young plants are transplanted once or twice. At the final transplanting they are about five inches apart in the hot-bed or cold frame.

Soil and Planting.—Tomatoes do best in a warm soil, either a good sandy loam or a light clay loam being suitable. It should be moderately rich in available plant food. Soil rich in nitrogen induces too much vegetative growth, but while the fruit is earlier on the poor, light soils there is not so much of it, hence one moderately rich in nitrogen with an adequate supply of phosphoric acid and potash is best. A soil which has been manured for a previous crop is usually in good condition for tomatoes, and they do well after clover as a rule. Each grower must learn for himself what his soil needs most. The ground should be thoroughly prepared for tomatoes, as for all other vegetables.

As the tomato is a tender plant it is not set out until danger of frost is over, the time ranging from the middle of May in the warmer sections to the first week of June where frost comes later.

Tomatoes should be planted four or five feet apart each way for field culture, but in the garden, where they may be trained if necessary, three feet each way is sufficient for the early varieties and those that are staked, or four by two and one-half feet for greater ease in getting among the plants. Care should be taken in planting not to disturb the soil about the roots of the plants while taking them from the hot-bed. The great advantage of having plants in pots or individual boxes is now very apparent, as those in this condition are not checked in their growth to any extent when planted out, and to obtain early fruit it is necessary to have as little checking of the growth as possible. If the plants become drawn up and lanky before they are set out they should be planted deeper in the ground than they would otherwise be. Roots will soon be thrown out from the buried stem. By planting tall plants deep in this way they will not be so easily broken by wind as they otherwise would be. Moreover, should there be a frost after planting, killing the plants to the ground, by removing two or three inches of the surface soil new shoots will soon be thrown out, the plants may be saved, and will soon grow rapidly again. This is a good plan in any case in the North where severe spring frosts are liable to occur. It is desirable to mound up the soil about the plants to support them and protect from frosts.

As cut-worms are often troublesome about the time the plants are set out, poisoned bran in the proportion of $\frac{1}{2}$ lb. Paris green thoroughly mixed with 50 lbs. moistened and sweetened bran, should be at once scattered on the surface soil about the plants. The cut-worms will eat this and die.

After planting, the chief work is cultivation, which should be done both ways in the plantation. Some hoeing will also be necessary. The surface soil should be kept loose from the day the plants are set out until they meet one another.

No training of the plants is practised in field culture as a rule, but if the weather should be wet and the soil found to be too rich, causing rank growth, it will check the growth somewhat if the plants are turned over. Usually, however, this is not necessary nor desirable. It is a good plan to mould up the soil towards the plants a little with the cultivator and hoe as this gives them some support.

In the home garden a very good way of growing tomatoes is to train them to stakes. By this method only one stalk is allowed to grow, the lateral shoots being pinched out as they appear, but leaving the flower clusters and all leaves on the main stem, the terminal shoot being tied to the stake as it grows. Stakes 5 feet long and about $1\frac{1}{2}$ inches in diameter are needed. Wires may be used

for supports instead of stakes if desired. Tomatoes grown by this method are very clean and more attractive-looking than those grown on the ground.

In parts of Canada where the nights are cool in summer, as on the prairies and in some parts of British Columbia, it has been found that tomatoes will ripen sooner when staked than when the plant is left on the ground and they are sometimes staked when grown commercially. If frost comes before many tomatoes are ripe, those which are only beginning to colour should be gathered before being injured, and they will ripen up in the house, or the vines may be carefully pulled with the tomatoes on and hung up.

The tomato is not affected by many insect pests or fungous diseases. If tomato plants are sprayed with Bordeaux mixture, beginning in the hot-bed and keeping the plants covered until the fruit is nearly ripe, several diseases can be controlled, and the flea beetle, which is sometimes quite troublesome, is prevented from doing much injury.

The best varieties of tomatoes change from time to time. At present, the Earliana, of which there are several strains varying somewhat in earliness and smoothness, is the best early, but Bonny Best and Chalk's Early Jewel are also very good early sorts, the latter being a good main crop variety also. Of later varieties, Matchless and Trophy are two good scarlet sorts, and Livingston's Globe and Plentiful two of the best purplish-pink varieties.

Tomato Culture under Glass.—It is being found quite profitable in Canada to grow tomatoes under glass. Moreover, persons having small green-houses and who are fond of tomatoes can readily grow a few plants and have enough fruit for home use in this way when there is none outside.

The best and most profitable time to have ripe tomatoes in the greenhouse is during the months of November and December, and the months of April, May and June. By sowing the seed in good time in the summer the main part of the crop will be set before the days become very short and before the weather becomes very cold and prevents the thorough ventilation and dry atmosphere which are desirable to ensure a good distribution of pollen and a good set of fruit. The spring crop, on the other hand, should come on as late as possible so that there will be a minimum amount of fuel used. It has not been found profitable to have tomatoes ripen in mid-winter as, on account of the poor light at blooming time, the conditions are unfavourable. Tomatoes should have abundant sunlight and there should be means of good ventilation. Each cropping season covers between two or three months.

If it is desired to have tomatoes in November and December, seed should be sown the first week in September. For a crop in April, May and June, seed should be sown the first week in September or late in October. The seed is sown as if plants were to be grown outside and the young plants are pricked out into flats three by three inches apart as soon as the first rough or true leaf appears. The young plants should be carefully watered so as to keep them thrifty. In about three weeks or less they should be transplanted to three and a half or four-inch pots, in which they remain until they are needed for planting in the bed. They should be ready for planting in about eight weeks from the time the seed is sown. If it is known in good time that the greenhouse will not be ready to receive the plants before they are liable to become pot-bound or stunted in the pots, it is desirable to transplant them into larger pots, as it is important to keep them growing. Some growers make two or three successive sowings of seed at intervals of two weeks, and in case they have not gauged the time of the first sowing accurately, they use the plants from the second or third. The rapidity of growth depends very much on the kind of weather and ventilation given; thus, the plants for the spring crop are usually longer in reaching the desired size for planting in the bed, which is just before the first flowers open, ten weeks being about an average time from the date of seeding. The best temperature for tomatoes is about 75° F. in the daytime, though it may run to 85° F., but if it continues high the plants will be too soft and liable to disease, hence it should be kept as

near 75° F. as possible. When the plants are young the temperature should be lower than during the fruiting season—from 60° F. to 65° F. in the daytime being high enough. At night the temperature should not run above 65° F., nor below 60° F. during the fruiting season.

Tomatoes may be either grown on benches in the greenhouse or on the ground. If grown on benches they should have ample soil so that there is no danger of the roots becoming dry, and there should also be good drainage. Good drainage is also very necessary when the plants are in beds on the ground. There should be from six to eight inches of good, rich loamy soil, such soil as they would do well in outside. Soil from rotted sod is good. Two crops may be grown on the same soil, but for the second it is desirable to dig in some well-rotted manure. It has been found that 20 x 18 inches apart is a satisfactory distance to plant in narrow beds, but in wide beds it is desirable to have a two and a half foot space lengthwise between every four rows to let in light and afford a better circulation of air. Another plan would be to have the plants 24 inches apart east and west and 18 inches apart north and south. The soil should be kept constantly moist, but care should be taken not to water too much. The surface soil should be loosened from time to time. Provision must be made for staking the plants. A horizontal wire is necessary six or seven feet above each row of plants, and there are several methods by which the plants are trained up to it. The most permanent method is to have a piece of stiff, No. 10, wire for each plant. This is stuck into the soil beside each plant and fastened to the horizontal wire above, then as the plant grows it is tied to the wire with raffia. Another plan is to have a lath serve the purpose of the wire; and another is to have a low, horizontal wire as well as the one above and use heavy cord or binder twine to support the plant, tying the plant to the cord with raffia. All side shoots are pinched out as they appear, the plant being trained to one stem. When they have grown to the upper wire the tips are pinched off and kept off. When the plants bloom, it is important to have the air of the greenhouse as dry as possible so that the pollen will be readily distributed, and good ventilation is desirable to keep the air dry. On dark days, particularly, the greenhouse is likely to be too damp unless well ventilated. Usually a good setting of fruit can be obtained of the autumn or early winter crop by tapping or slightly shaking the plants daily about midday, thus causing the pollen to be scattered and make it more certain of reaching all parts of the stigma, ensuring both a better setting and more perfect fruit, as, if only part of the stigma receives pollen, the fruit will be one-sided or irregular. For the crop which blooms in winter, artificial pollination is desirable, the pollen being dusted from one flower to another. A camel's hair brush to dust on the pollen which has been previously collected on a watch glass, or on a rabbit's tail tied to a stick, with which the flowers are brushed, are good instruments for this purpose. A fair yield per plant under glass in Canada is 3 to 5 lbs., although the yield may be considerably lower if the fruit sets badly, or it may be somewhat higher. Tomatoes grown in twelve inch pots in the greenhouse give good results. The soil and drainage should, however, be good. Grown in this way the plants can be moved before the crop is quite over, making the space available for something else.

The variety most generally grown under glass is Livingston's Globe, which is purplish-pink in colour, smooth and very solid, making it a good shipper. It does not ripen as soon as some others, but it is one of the best yielders in the long run. Three scarlet varieties which have given good results at the Central Farm are Bonny Best, Industry and Sutton's Satisfaction, smooth sorts with firm flesh and good quality.

There are several diseases which affect the tomato when grown under glass, and as they are difficult to control, it is desirable, by good ventilation and proper attention to temperature, to avoid having them.

As the white fly is sometimes very troublesome in greenhouses, it is necessary to control it, when present, if one is to have good success in growing tomatoes

and here is nothing so satisfactory as hydrocyanic acid gas for this purpose. This gas is, however, a deadly poison and great care must be taken in using it. Following is a formula found to be effective in killing the flies without injury to the plants. As the eggs are not destroyed, it is necessary to fumigate at intervals in order to keep the insects under control.

Fumigating Greenhouse with Hydrocyanic Acid Gas.

Formula:—1 ounce cyanide of potassium; 2 ounces sulphuric acid; 4 ounces water for every 4,000 cubic feet of greenhouse space. Make the greenhouse as nearly airtight as possible and have the foliage dry. Wrap the cyanide of potassium in thin tissue paper and, as it is a deadly poison, avoid handling it. Pour the water into a wide-mouthed crockery or earthenware vessel, then add the sulphuric acid. Then start walking quickly from one end of the greenhouse towards the other and, if several vessels are used, which is desirable if the greenhouse be a long one, drop a paper of cyanide, without unwrapping, when passing, into each vessel containing the right proportion of water and sulphuric acid; and then go on out through the door at the other end, holding the breath and closing the door, and on no account lingering in the greenhouse as there would be fatal results by doing so, since the poisonous gas rises and spreads rapidly. It is best to fumigate in the evening and keep the house closed until morning, when open doors and ventilators from the outside. In order to make it still safer, the cyanide of potassium may be suspended by a string above the vessel containing the sulphuric acid and water and lowered into it from outside the greenhouse. To ensure a good distribution of the gas, the vessels should be placed at about thirty feet apart and the necessary proportions of the materials used estimated from the formula and the area of the greenhouse.

